Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No.....

MCSE/MSE-101

M.E./M.Tech. I Semester

Examination, June 2017

Advanced Computational Mathematics

Time : Three Hours

 Maximum Marks : 70

Note: i) Answer any five questions.
ii) All questions carry equal marks.

1. Define linearly dependent and linearly independent. Determine whether or not of the following vector in R^3 is linearly dependent.
$u_1 = (1, 2, 5)$
$u_2 = (1, 3, 1)$
$u_3 = (2, 5, 7)$
$u_4 = (3, 1, 4)$

2. Define linearly transformations. let F: $R^4 \rightarrow R^3$ be the linear mapping defined by $F(x, y, z, t) = (x - y + z + t, 2x - 2y + 3z + 4t, 3x - 3y + 4z + 5t)$
Find a basis and the dimension of the image of F.

3. Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ in $0 \le x \le 4, 0 \le x \le 4$ given that

$u(0, y) = 0, u(4, y) = 81.2y$ $u(x, 0) = \frac{x^2}{2}$ and $u(x, 4) = x^2$

take $h = k = 1$ and obtain the result correct to one decimal places.

413

4. Using the method of separation of variable solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x, 0) = 6e^{-3x}$.

5. Out of 800 families with 4 children each how many families would be expected to have
i) 2 boys and 2 girls
ii) At least one boy
iii) No girl
iv) Atmost two girls. Assume equal probabilities for boys and girls

6. Find the mean deviation from mean for normal distribution.

7. What is queuing problem? Explain queuing system, transient and steady state.

8. Explain the terms
i) Markov process
ii) Transition probability
iii) Matrix of transition probability
iv) Ergodic process
v) Equilibrium of steady state

******